was used to assess the population level public health and economic impact of infant anti-pneumococcal vaccination. The alternatives compared were: no vaccination (comparator), PCV-7, PCV-10 and PCV-13. The effectiveness measures were: child illness avoided, life years gained (LYs) and quality-adjusted life years (QALYs) gained. Effectiveness and utilities were obtained from literature. Local costs (expressed in 2011 $US) and epidemiology (data from 2009-2011) were obtained from Panamá's official databases. Univariate sensitivity analysis was performed. The time horizon for total costs was one year and for outcomes was lifetime with a discount rate of 3%. **RESULTS:** Results show that immunization is cost-saving against no-vaccination. PCV-13 gained the highest number of QALYs (305) against PCV-10 (191) and PCV-7 (168). PCV-13 prevented 629 illnesses and gained 334 LYs. PCV-10 and PCV-7 prevented 392 and 359 illnesses and gained 208 and 182 LY's, respectively. Total costs of illness with PCV-13, PCV-10, PCV-7 and no vaccination were $622,445, $777,878, $804,978 and $1,005,512, respectively. These results were robust to variations in herd immunity and impact adjustments of PCV-10 immunogenicity. **CONCLUSIONS:** This is the first cost-effectiveness study for anti-pneumococcal immunization in Panamá. Immunization strategies based on 7, 10 and 13-valent PCV's may be cost-saving interventions compared to no vaccination. PCV-13 dominates PCV-10 and PCV-7.

PIN64

COST-EFFECTIVENESS ANALYSIS OF ANTI-PNEUMOCOCCAL VACCINES IN GUATEMALA

Lutz MA[1], Grazioso C[2], Morales G[3], Strutton DR[4], Roberts CS[5], Farkouh RA[4], Cuesta G[3]
[1]*Pfizer S.A., Escazú, San Jose, Costa Rica,* [2]*Hospital General San Juan Dios, Guatemala City, Guatemala,* [3]*Pfizer Central America and the Caribbean, Escazú, San Jose, Costa Rica,* [4]*Pfizer, Inc., Collegeville, PA, USA,* [5]*Pfizer, Inc., New York, NY, USA*

OBJECTIVES: . Pneumococcal bacteremia and pneumonia are priority diseases for public health in Guatemala since these are among the 10 most frequent causes of hospitalizations and mortality in children under 4 years old. The aim of this study was to estimate the cost-effectiveness of immunization strategies based on pneumococcal conjugate vaccines (PCVs) in Guatemala, from an institutional perspective. **METHODS:** . A decision tree steady state model was used to assess the population level public health and economic impact of infant anti-pneumococcal vaccination. The alternatives compared were: no vaccination (comparator), PCV-10 and PCV-13. The effectiveness measures were: illness avoided life years gained (LYs) and quality-adjusted life years (QALYs) gained. Effectiveness and utilities were obtained from literature. Local costs (expressed in 2011 $US) and epidemiology (data from 2009-2011) were obtained from Guatemala's official databases. Univariate sensitivity analysis was performed. The time horizon for total costs was one year and for outcomes was lifetime with a discount rate of 3%. **RESULTS:** . Results show that immunization is cost-saving against no-vaccination. PCV-13 gained more QALYs (7,569) against PCV-10 (5,824). PCV-13 prevented 5658 illnesses and gained 8404 LYs, while PCV-10 prevented 4140 illnesses and gained 6465 LYs. Total costs of illness with PCV-13, PCV-10 and no vaccination were $2,599,952, $3,071,811 and $5,534,657, respectively. These results were robust to variations in herd immunity and impact adjustments of PCV-10 immunogenicity. **CONCLUSIONS:** . This is the first cost-effectiveness study for anti-pneumococcal immunization developed in Guatemala. Immunization strategies based on 10 and 13-valent PCV's may be cost-saving interventions. PCV-13 dominates PCV-10.

PIN65

HEALTH ECONOMIC MODEL ON THE COSTS AND EFFECTS OF ROTA VIRUS VACCINATION IN GERMANY

Knoll S[1], Benter U[2], Standaert B[3]
[1]*GlaxoSmithKline GmbH & Co. KG, Munich, Bavaria, Germany,* [2]*Kendle GmbH, Munich, Bavaria, Germany,* [3]*GlaxoSmithKline Biologicals, Wavre, Belgium*

OBJECTIVES: Rotavirus gastroenteritis (RVGE) is one of the most frequent diseases among children aged 5 or younger. A general recommendation for rotavirus vaccination in Germany does not exist so far, leading to a vaccination rate of < 30%. This analysis simulates the cost-effectiveness of a general rotavirus vaccination in Germany using Rotarix™ from the perspective of the statutory health insurance (SHI). **METHODS:** An existing Markov model on rotavirus infection in children (published before) was adapted to the German situation. The model simulates costs and effects of rotavirus vaccination in a birth cohort of 699,301 children. In the model, vaccine efficacy rates from international clinical trials were combined with German epidemiology and cost data from the SHI perspective for 2011 (including SHI reimbursed productivity losses of parents). The model assumes a vaccination rate of 100% and discount rates of 3% for costs and effects. Results were tested for robustness using sensitivity analyses. **RESULTS:** A 100% vaccination with RotarixTM could avoid approximately 156,000 RVGE cases and associated physician visits as well as in-patient hospital stays. From the SHI perspective, this leads to cost savings of 13.6 Mio € in total. The main factors responsible for these savings are in-patient hospital stays avoided (64.1 Mio €), SHI reimbursed productivity losses of parents (19.0 Mio €) and physician visits avoided (5.4 Mio €). On the other hand, vaccination costs amount to additional 79.4 Mio €. Stability of results was most sensitive with respect to epidemiological parameters (number of RVGE cases, in-patient hospital cases) as well as productivity loss. **CONCLUSIONS:** A general™ vaccination against rotavirus in Germany can avoid severe diarrhea events in children aged 5 and younger. Additional vaccination costs for the SHI are more than outbalanced by cost savings through in-patient hospital stays, SHI reimbursed productivity loss and physician visits avoided.

PIN66

COST OF VIROLOGIC FAILURE WITH ETRAVIRINE AND RALTEGRAVIR IN THE BRAZILIAN NATIONAL AIDS PROGRAM

Morais AD[1], Pereira ML[2], Azevedo H[3]
[1]*Janssen Cilag Farmaceutica, Sao Paulo, Sao Paulo, Brazil,* [2]*Janssen Cilag Farmaceutica, São Paulo, Brazil,* [3]*Janssen Cilag Farmaceutica, São Paulo, São Paulo, Brazil*

OBJECTIVES: To estimate the cost of virologic failure with the treatment of etravirine and raltegravir in multi-experienced patients in the Brazilian National AIDS Program. **METHODS:** Treatment regimens of etravirine and raltegravir were defined by the guidelines of the Brazilian National AIDS Program. Upon virologic failure, subsequent treatments were defined according to the same guidelines considering new drug combinations not yet used by the patients. Treatment costs considered the cost of medication as purchased by the Brazilian government and published on their website. As maraviroc, a rescue treatment, is not yet reimbursed by the AIDS program, its price was defined by law. To estimate the total cost, patient numbers were calculated by the number of capsules of raltegravir dispensed in the past 96 weeks, and assumed the same for patients treated with etravirine. Virologic failure was gathered from the phase III clinical trials of raltegravir and etravirine at week 48 and week 96. **RESULTS:** The average cost of treatment for multi-failure patients with etravirine was on average R$ 26.692,26 at week 48 of treatment compared to R$ 26.634,15 per patient treated with raltegravir. At week 96, the average treatment cost per patient was R$ 56.810,59 for raltegravir and R$ 53.904,30 for etravirine. Given that 3.942 patients received treatment in the previous 98 weeks, around 1.301 patients will fail treatment with raltegravir and 630 with etravirine. The total cost of treating these patients is R$ 73 million for raltegravir and R$ 34 million for etravirine. **CONCLUSIONS:** Despite a similar average cost at week 48, etravirine treatment is a more economic option for the treatment of multi-failure patients compared to raltegravir, saving up to 50% of treatment costs with virologic failure patients in the Brazilian National AIDS program over 96 weeks. Virologic failure is therefore an important indicator to avoid subsequent treatment costs especially in the long-term.

PIN67

COST-EFFECTIVENESS ANALYSIS OF PEGINTERFERON ALFA-2A (40KD) IN HBEAG-NEGATIVE CHRONIC HEPATITIS B IN POLAND

Jakubczyk M[1], Pawèska J[2], Niewada M[2], Berak H[3], Szkultecka-dèbek M[4], Russel-szymczyk M[4]
[1]*Warsaw School of Economics, Warsaw, Other ->, Poland,* [2]*HealthQuest spółka z ograniczoń odpowiedzialnośći Sp. K., Warsaw, Poland,* [3]*Hospital for Infection Disease, Warsaw, Poland,* [4]*Roche Polska Sp. z o.o., Warsaw, Poland*

OBJECTIVES: The analysis aimed to evaluate the cost-effectiveness of 48-week therapy with peginterferon alpha-2a (PegIFNα-2a) in HBeAg-negative chronic hepatitis B (CHB) patients versus 48-week (short-term analysis) or 4-year (long-term analysis) therapy with adefovir, entecavir or lamivudine from the public payer perspective in Poland. **METHODS:** A life-time Markov model based on previously published analysis was used. States encompassed treatment response (ALT normalization), relapse, complications (compensated/decompensated cirrhosis, hepatocellular carcinoma, liver transplantation) and death. Quality-adjusted life years (QALYs) were the measure of effectiveness. Short-term efficacy assessment was based on the results of randomized clinical trials (RCTs) corrected for response duration. Long-term efficacy data for nucleos(t)ide analogues (NAs) were derived from other published models and RCTs extensions. Utilities and transition probabilities (spontaneous response, relapse, complications, death) were derived from published literature. Direct medical costs, i.e. costs of drugs and procedures used in the treatment of CHB and its complications were obtained using a survey conducted among Polish clinicians. In the base case analysis costs and benefits were discounted at a 5% and 3.5% annual rate, respectively. The robustness of the results was assessed using one-way, scenario and probabilistic sensitivity analyses. **RESULTS:** The short and long-term analysis demonstrated that the use of PegIFNα-2a increased QALYs and life years gained (LYGs) compared to all investigated NAs. In the short-term model PegIFNα-2a decreased the costs of complications treatment and increased the overall costs due to drug acquisition cost. ICERs for PegIFNα-2a vs. lamivudine, adefovir or entecavir amounted to 43,621, 6,600 and 25,166 PLN/QALY, respectively (1€≈4 PLN). In the long-term model PegIFNα-2a was cost-saving and dominated adefovir, while ICERs vs entecavir and lamivudine amounted to 5,385 and 73,857 PLN/QALY, respectively. Sensitivity analysis proved these results to be robust. **CONCLUSIONS:** Peginterferon alfa-2a is cost-effective when compared to adefovir, entecavir and lamivudine in Poland.

PIN68

COST- EFFECTIVENESS ANALYSIS OF HUMAN PAPILLOMAVIRUS VACCINATION PROGRAM IN RUSSIA

Omelyanovsky V, Avxentyeva M, Krysanov I, Ivakhnenko O, Goryaynov S, Tsfasman FM
Research Center for Clinical &Economic Evaluation and Pharmacoeconomics (RC CEE&Ph), Russian State Medical University, Moscow, Russia

OBJECTIVES: To estimate cost-effectiveness of the vaccination program with quadrivalent Human Papillomavirus (HPV 6, 11, 16, 18) recombinant vaccine for the prevention of cervical intraepithelial neoplasia (CIN) and cervical cancer (CC) in Russian health care. **METHODS:** Cost-effectiveness analysis of vaccination program vs no vaccination was performed. The previously published model (R. Insinga et al.) was adjusted for Russia. Rates of CIN and CC were simulated with and without vaccination in a cohort of girls 12-13 years old. Time-horizon was 24 years. 100% vaccination coverage was assumed. Direct medical costs were estimated. Outcomes measured were: the cost of averted CIN case and the cost per additional life-year saved. **RESULTS:** The cost of introducing HPV vaccination program with 100% coverage of the target audience of 12-13 years old girls is 408,16 mln € (16,282,34 bln rubles). In the absence of vaccination the costs of providing medical care to patients with CIN and CC are 160,027 mln € (6, 36 bln rubles). Therefore the overall costs in a vaccinated cohort were 481,14 mln € (16,285,25 bln rubles). HPV

vaccine prevents 408 469 cases of precancerous cervical lesions. Due to HPV vaccination the incidence of CC is reduced by1858 cases, which corresponds to 31 588 years of life saved in the vaccinated cohort. The cost of an additional life-year saved is 10,166 € (405,535 rubles), and the cost of averted CIN case is 786 € (31,360 rubles). **CONCLUSIONS:** Vaccination with Human Papillomavirus recombinant vaccine seems a cost-effective option in Russia.

PIN69

METHODOLOGICAL CHALLENGES FOR ECONOMIC EVALUATIONS OF VACCINATION PROGRAMS: THE CASE OF PERTUSSIS BOOSTER VACCINATION

Millier A[1], Aballea S[2], Annemans L[3], Quilici S[4]
[1]Creativ Ceutical, Paris, France, [2]Creativ Ceutical, Paris, Ile de France, France, [3]Ghent University, Ghent, Belgium, [4]Sanofi Pasteur MSD, Lyon, France

OBJECTIVES: Pertussis incidence has been increasing in adolescents and adults in the last two decades with transmission to vulnerable young infants. This epidemiological changing has raised interest in the cost-effectiveness of booster vaccination (extra administration of a vaccine after an earlier dose). A critical review of economic evaluations of pertussis booster vaccination was performed in order to develop recommendations for future studies. This review illustrates specific challenges encountered in economic evaluations of vaccination programmes. **METHODS:** The literature search covered cost-effectiveness studies of pertussis booster vaccination, published until November 2010, worldwide. We extracted information on model structures, input data and results. **RESULTS:** We identified 13 publications (9 distinct models) referring to cost-effectiveness of pertussis booster vaccination. The most frequently studied strategies were adolescent booster vaccination (9/13), cocooning strategy, i.e. vaccination of mothers and family member(s) of newborn infants (6/13), one-time adult pertussis booster vaccination (6/13), and decennial vaccination of adults with pertussis containing boosters (4/13). All studies found that booster vaccination was a cost-effective or cost-saving strategy compared to no booster vaccination. However, conclusions differed concerning the exact age groups to vaccinate and frequency of vaccination. Results were strongly affected by assumptions regarding unreported cases and uncertainty around incidence. Four models ignored herd immunity (HI) effects, 3 assumed incidence reduction attributable to HI, and 2 were transmission dynamic models predicting HI effects. Several studies considered incidence at steady state, although it was not reached before 80 years for some strategies. Methods used to compare multiple strategies were often inappropriate. **CONCLUSIONS:** Reviewed studies showed that pertussis booster vaccination is cost-effective or dominant vs. no booster vaccination, but did not identify any optimal vaccination schedule. Results are variable due to uncertainty surrounding disease incidence and extent of HI. Future economic evaluations should explore a wider range of strategies, according to local context.

PIN70

MODELLING THE EPIDEMIOLOGICAL IMPACT OF ROTAVIRUS VACCINATION TO ASSESS ITS COST-EFFECTIVENESS IN ENGLAND AND WALES

Atkins KE[1], Shim E[2], Carroll S[3], Quilici S[4], Galvani AP[1]
[1]Yale University, New Haven, CT, USA, [2]University of Pittsburgh, Pittsburgh, PA, USA, [3]Sanofi Pasteur MSD, Maidenhead, UK, [4]Sanofi Pasteur MSD, Lyon, France

OBJECTIVES: Rotavirus infection causes severe gastroenteritis in children worldwide. Its disease burden has been reduced in countries where mass rotavirus vaccination programmes have been introduced. England and Wales (E&W) have not yet implemented such a mass vaccination programme, but are currently re-evaluating its potential cost-effectiveness. Our study uses a dynamic model to predict the epidemiological and economical effect of such a mass vaccination programme in E&W beginning in the autumn of 2011. **METHODS:** A previously published age-structured dynamic model was upgraded and parameterised with country-specific data for the introduction of the oral rotavirus pentavalent vaccine. We report the impact of vaccination on disease incidence reduction, timing of seasonal epidemics and herd immunity levels. The model was then used to assess whether a mass vaccination of RotaTeq is cost-effective and affordable for E&W. **RESULTS:** Our results predict that vaccination can reduce the burden of severe disease by 70% and delay the epidemic peak by two and a half months with coverage of 95%. Our calculations further show that herd immunity accounts for about a quarter of the reduction in incidence. If the pentavalent vaccine-induced immunity does not wane over five years, severe disease in children under five years of age is eliminated within two years after the introduction of vaccination. The probability of a mass vaccination strategy being cost-effective is presented under likely vaccine waning scenarios, administration cost assumptions and possible dose prices. **CONCLUSIONS:** This work allows policymakers to determine both the epidemiological impact and cost implications of a mass vaccination programme against rotavirus with the pentavalent vaccine in England and Wales. Although long considered unlikely to be cost-effective in E&W using static models, the pentavalent vaccine demonstrates a significant impact in reducing rotavirus cases at acceptable levels of cost-effectiveness when using appropriate modelling techniques.

PIN71

PHARMACOECONOMIC ANALYSIS OF TREATMENT OF COMMUNITY-ACQUIRED PNEUMONIA (CAP)

Zaitsev A[1], Synopalnikov A[2], Tyrsin O[3]
[1]The Main Military Clinical Burdenko Hospital, Moscow, Russia, [2]Russian Medical Academy of post-graduate education, Moscow, Russia, [3]Bayer Healthcare Pharma, Moscow, Russia

OBJECTIVES: Evaluation of comparative cost-effectiveness of CAP treatment with moxifloxacin versus combined therapy with cefotaxime and macrolides in adult patients. **METHODS:** Patients were randomized in two groups. MOX group received moxifloxacin 400 mg i.v. once-daily with further switch to oral formulation 400 mg daily. COMB group received either cefotaxime 1000 mg i.m. 3 times per day as monotherapy or in combination with oral azithromycin or clarithromycin. Efficacy and safety criteria were evaluated according to clinical data, laboratory tests and X-ray examination. Cost-effectiveness analysis was performed. **RESULTS:** MOX group included 30 patients, mean age 33.6±16.5 years; COMB group included 50 patients, mean age 26.5±15.6 years. The efficacy of moxifloxacin treatment was 96.7%, in-hospital stay duration was 15.9±3.3 days. The efficacy of treatment in COMB group was 88.0%, patients were discharged after 18.2±3.7 days. Direct medical costs including antibacterial treatment and in-hospital days were 46712 RUB (€1173) in MOX group and 46970 RUB (€1180) in COMB group. CERMOX = 48307 RUB (€1213), CERCOMB = 53375 RUB (€1340). **CONCLUSIONS:** CAP treatment with moxifloxacin compared to combined therapy with cefotaxime and macrolides in adult patients is more effective and cost saving technology.

PIN72

COST-EFFECTIVENESS OF ROTAVIRUS IMMUNIZATION IN VIETNAM: RESULTS AND CHALLENGES

Tu HAT[1], Rozenbaum M[2], Coyte PC[3], Li SC[4], Postma MJ[5]
[1]University of Groningen, Groningen, The Netherlands, [2]Rijksuniversiteit Groningen, Groningen, The Netherlands, The Netherlands, [3]University of Toronto, Toronto, ON, Canada, [4]University of Newcastle, Callaghan , NSW, Australia, [5]University of Groningen, Groningen, The Netherlands, The Netherlands

OBJECTIVES: To assess the cost-effectiveness of universal rotavirus immunization, explicitly the use of Rotateq® and affordability of implementing rotavirus immunization based on the Global Alliance for Vaccines and Immunization (GAVI)-subsidized vaccine price in the context of Vietnamese health care system for the next 5 years. **METHODS:** An age-structured cohort model was developed for the 2009 Vietnamese birth cohort and applied a 5-year time horizon with time cycle of 1 month for < 1-year-old children and annually thereafter. Results from no vaccination and vaccination were compared. Outcomes included rotavirus episodes requiring home-treatment, outpatient visits, hospitalizations and deaths. Multiple outcomes per rotavirus infection are possible in the model. Acceptability and affordability analyses were done using Monte Carlo simulations. Costs were expressed in 2009 US$. **RESULTS:** Rotavirus immunization would not completely protect under-five-year-old children against rotavirus infection due to partial nature of vaccine immunity, however, would effectively reduce rotavirus severe cases by ~55%. Under the GAVI-subsidized price, the minimum vaccination budget would be US$1.6 million annually. In the base-case, the incremental cost per quality-adjusted-life-year (QALY) was US$665 from health care perspective, <Vietnamese per-capita-GDP in 2009. Affordability results showed that at the GAVI-subsidized vaccine price, rotavirus vaccination could be affordable in Vietnam. **CONCLUSIONS:** Rotavirus immunization in Vietnam would be a cost-effective health intervention. However, it only becomes affordable under the GAVI's financial support. Vaccine price is the most crucial factor to decision-makers regarding introducing this vaccine into the country's immunization. Given the high under-five mortality rate, results showed that rotavirus immunization is the "best hope" for prevention of rotavirus-related diarrhoeal disease in Vietnam. In the next five years, Vietnam is definitely in debt to external financial support in implementing rotavirus vaccination. It is recommended that new and cheaper rotavirus vaccine candidates be developed to speed up rotavirus vaccines introduction in the developing world.

PIN73

MODELING THE LONG TERM CLINICAL OUTCOMES AND HEALTH CARE COST IMPACT OF INITIATING TREATMENT WITH ATAZANAVIR/R COMPARED WITH DARUNAVIR/R, LOPINAVIR/R AND EFAVIRENZ FOR HIV-1 INFECTED TREATMENT-NAÏVE PATIENTS: COUNTRY RESULTS FOR ITALY, SPAIN, PORTUGAL AND UK

Thuresson PO[1], Verheggen B[1], Heeg B[1], Aldir I[2], Carrasco J[3], Didoni G[4], Mesa OA[5], Lescrauwaet B[6]
[1]Pharmerit International, Rotterdam, The Netherlands, [2]Hospital Egas Moniz, Lisboa, Portugal, [3]Bristol-Myers Squibb, Paço de Arcos, Portugal, [4]Bristol Meyer Squibb, Rome, Italy, [5]Bristol-Myers Squibb Pharmaceuticals Ltd, Uxbridge, Middlesex, UK, [6]Xintera Consulting BVBA, Leuven, Belgium

OBJECTIVES: To estimate the cost and effects of initiating treatment with atazanavir/r (ATV/r) compared to darunavir/r (DRV/r), lopinavir/r (LPV/r) and efavirenz (EFV) in treatment-naïve HIV-1 patients in Italy(I), Spain(S), Portugal(P) and UK. **METHODS:** HIV-disease progression is modeled using a micro-simulation model. Health states are a function of HIV-RNA, CD4+cells, AIDS defining events (ADEs), and comorbidities. At model entry patients receive either ATV/r, LPV/r, DRV/r, or EFV with a treatment backbone. Treatment-sequences are modelled following treatment discontinuation due to virological failure, adverse events, resistance, or treatment related co-morbidities. Country-specific patterns for HIV related drug use were applied to estimate specific treatment sequences; maximized at 8 treatment lines after which patient were assumed to be untreated. Efficacy and tolerability inputs of first line treatments were derived from a Mixed-Treatment-Comparison, supplemented by published literature and product-SPCs for remaining drug specific data for efficacy, tolerability and safety. Occurrence of (non)-AIDS defining malignancies was linked to current CD4+cell count and independent of therapy. Cost estimates were based on country specific sources. A 25-year time-horizon was chosen for the base-case analyses. A payer's perspective was chosen and country-specific discount rates were applied. **RESULTS:** Across countries, total costs per patient who started with ATV/r ranged between €126,947(I) and €154,285(P). Predicted incremental costs of ATV/r versus comparators ranged between -€27,004 (S) versus LPV/r and -€13,165 (P) versus EFV. Estimated incremental QALYs of ATV/r versus comparators varied from -0.68(UK) versus EFV to 0.78(UK)